

NOTES ON THE LIFE HISTORY OF *AMAZILIA FIMBRIATA* IN SURINAM

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LESSON'S Emerald is a medium-sized hummingbird with a rounded tail. Above it is bronze-green, darker on the head and tail, brighter and more glittering on the under surface. The bill is almost straight. Three males that I collected in Surinam weighed 4.5, 4.8, and 5.8 grams; two females weighed 4.9 and 5.8 grams. The sexes are indistinguishable in the field.

The species occurs from northern Venezuela to southeastern Brazil. Peters (1945:64-65) recognizes eight races. The subspecies here reported on, *A. f. fimbriata*, occurs in eastern Venezuela and the three Guianas (Zimmer, 1950). In coastal Surinam, Lesson's Emerald is the commonest hummingbird, even in the gardens in the town of Paramaribo.

THE BREEDING SEASON

The main breeding season seems to be in July and August, at the end of the long rainy season and the beginning of the long dry season.

On July 21, 1951, in my garden in Paramaribo, two birds were constructing nests on horizontal branches. Nest A was two meters above the ground in a *Lagerstroemia*; nest B was five meters from the ground in a tree. Nest A was deserted a few days later but a new nest (by the same female?) was under construction on August 4, only a few centimeters from the deserted nest and on the same branch. The new nest also was deserted, on August 11, after I had weighed and measured the eggs. A third nest, probably built by the same bird, was found on August 13, in a nearby tree.

Nest B was deserted on July 28, when it was almost completed. On August 12, I found another nest about one meter from nest B and on the same branch. The (apparently) two females involved in nests A and B and subsequent nests mentioned above were incubating eggs on August 20.

Lesson's Emerald breeds also at the end of the year at the start of the short rainy season and in the following short dry season. I found a nest with one egg on November 3, 1951, and another nest with two young on November 17, 1948. These young left the nest on December 3. On December 30, 1949, I saw a bird building a nest, and on January 17, 1952, a hummer was incubating two eggs in a nest in my garden. Further, I found a hummingbird incubating two eggs on March 8, 1952. The latter date is in the short dry season.

In July, 1950, a nest was built in a *Bougainvillea* in my garden at a height of approximately 1.5 meters. This nest was just in front of one of my windows and thus offered an excellent opportunity to observe the birds during the entire breeding cycle.

I saw no courtship or territorial behavior. Only one adult was seen at the nest and I assume that this bird was a female, since male hummingbirds usually do not participate in nesting activities.

NEST-BUILDING

On July 25, I discovered, on a horizontal branch, the foundation of the nest last mentioned. On July 27, I saw the bird shaping the small nest cup by trampling with its feet as it stood in the nest and by pressing the underside of its bill and throat on the outer wall of the nest. On this date, the shallow cup was composed of white vegetable material. There were no lichens on the outer wall.

On July 28, between 15:25 and 15:42, the bird came to the nest eight times with nesting material. Again, it shaped the nest by trampling. During the trampling, the bird's entire body seemed to tremble. As the bird turned around in the nest, it often leaned to one side, at which time the movements of the foot on the opposite side could be seen distinctly. Nest-building ceased when a rain shower started.

On July 31, the first egg was laid (hour unknown) but nest-building was continued most energetically. The bird sat on the nest from 12:15 to 12:40; detailed notes taken between 13:30 and 14:30 follow.

The bird worked on the nest from 13:30 to 13:31; returned at 13:35, worked until 13:38; it then sat on the nest until 13:41; it left at 13:43. Returning at 13:44, it built until 13:45 and then flew away. I saw then that it was picking "wool" from an unidentified plant a short distance from the nest. It returned to the nest with a large piece of "wool," built, went back to the same plant, and returned to the nest with more "wool." At 13:47, the bird disappeared. It returned at 13:55, built until 13:57, left, returned at 13:58 for one minute, left again in one-half minute to make two quick trips for "wool." The bird left at 14:00 but returned almost immediately and worked on the nest; it sat and trampled. The bill was open although the nest was in shade. The bird left in half a minute and was back at 14:01, built, left, returned at 14:02, and departed in half a minute. It returned at 14:03, left at 14:04, and was building again at 14:05. It then remained on the nest until 14:09, then left. It returned with a large piece of "wool" at 14:10 and built for one-half minute and left. It was back again at 14:11, built, and left at 14:14; it returned in one-half minute. From 14:17 to 14:24, the bird worked on the nest. It then sat as though incubating until 14:27; it trampled in the nest until 14:29.

In one hour of observation, the hummingbird came to the nest 19 times with nesting material.

On August 1, the nest still held only one egg. The bird sat on the nest from 9:45 to 9:53. Between 11:05 and 11:30, it spent 23 minutes sitting on the nest and was absent four times in this period. The interval from the start of nest-building to the laying of the first egg was one week. As noted, however, nest-building continued through the day of laying of the first egg (see also below, under incubation).

That hummingbirds steal material from other nests is well-known. Skutch (1931) gives some examples of the destruction of nests of *Amazilia tzacatl* by other individuals of the same species. Fortunately, the nest I observed in 1950 did not suffer damage, although *Amazilia fimbriata* does steal nesting material from other birds.



FIG. 1. Lesson's Emerald (*Amazilia fimbriata*) at its nest. Photographed near Paramaribo, Surinam, on September 1, 1950, by Fr. Haverschmidt.

In December, 1949, I had under observation in my garden a nest of a flycatcher, *Camptostoma obsoletum*, in which two young had hatched on December 22. At 13:59 on December 30, I saw an *Amazilia fimbriata* alight at the side entrance to the domed nest, reach in and take some white "wool" from the inside of the nest, and fly with this material to its own nest, which was under construction rather high in a nearby tree. The hummingbird soon returned to the flycatcher's nest but was chased away by one of the parent birds. A little later the hummer visited the nest for the third time and took a rather large clump of "wool" from the inside. On December 31, I found the flycatcher nest in a deplorable state with the nest-lining much disrupted and the young gone. The *Amazilia* came three times in quick succession to

TABLE I

ATTENDANCE OF *A. fimbriata* AT NEST. Letter "N" preceding time on nest indicates that adult returned at that time with nesting material.

DATE	TIME OF OBSERVATION	TIME ON NEST	TIME OFF NEST
August 2	7:18- 8:18 13:25-14:25	7:18- 7:42 7:51- 8:18 13:25-14:25	7:42- 7:51
August 3	13:15-14:15	13:18-13:33 N13:35-13:43 N13:44-13:45 N13:46- N13:47-13:48 N13:50-13:56 N13:58-14:03 N14:04-14:06 14:08-14:13	13:15-13:18 13:33-13:35 13:43-13:44 13:45-13:46 13:46-13:47 13:48-13:50 13:56-13:58 14:03-14:04 14:06-14:08 14:13-14:15
August 4	13:55-14:55 15:50-16:50	13:55-14:55 15:50-15:54 N16:02-16:13 N16:17-16:19 N16:20-16:27 N16:31-16:37 N16:42-16:50	15:54-16:02 16:13-16:17 16:19-16:20 16:27-16:31 16:37-16:42
August 5	6:40- 7:40	6:40- 6:49 6:55- 7:22 7:28- 7:40	6:49- 6:55 7:22- 7:28
August 6	6:28- 7:28	N 6:28- 6:38 N 6:45- 7:05 N 7:13- 7:28	6:38- 6:45 7:05- 7:13
August 7	13:20-14:20	13:20-13:58	13:58-14:20
August 8	8:50- 9:50	8:50- 8:59 N 9:00- 9:01 N 9:02- 9:04 N 9:05- 9:07 N 9:10- 9:12 N 9:13- 9:24 9:28- 9:29 N 9:31- 9:39 9:41- 9:43 9:49- 9:50	8:59- 9:00 9:01- 9:02 9:04- 9:05 9:07- 9:10 9:12- 9:13 9:24- 9:28 9:29- 9:31 9:39- 9:41 9:43- 9:49
August 9	14:25-16:15	14:25-14:28 N14:46-15:22 N15:32-15:33 N15:38-16:15	14:28-14:46 15:22-15:32 15:33-15:38
August 10	14:25-15:25	14:25-14:30 N14:31-14:33 N14:42-15:25	14:30-14:31 14:33-14:42
August 11	15:13-16:38	15:13-15:41 N16:06-16:10 N16:38-	15:41-16:06 16:10-16:38
August 12	15:00-16:30	15:17-15:55 N16:03-16:30	15:00-15:17 15:55-16:03
August 13	7:55- 8:55	7:55- 8:32 N 8:45- 8:55	8:32- 8:45
August 15	7:25- 8:25	7:25- 7:55 N 8:06- 8:25	7:55- 8:06

steal material for its own nest. On one visit the hummingbird was chased away by an adult *Camptostoma*.

EGG LAYING

The eggs of Lesson's Emerald apparently are laid on alternate days. In the nest which I observed in 1950, the first egg was laid on July 31, the second on August 2. In a nest built in my garden in 1951, the first egg was laid on August 8, and the second on August 10. In another, the first egg was laid November 3, the second November 5, and in still another nest, the first egg was laid March 6, the second March 8. The measurements of the eggs in the second nest mentioned were: 13.3×8.5 , and 13×8.4 mm. These eggs weighed 0.55 and 0.50 grams, respectively.

INCUBATION

Building and maintenance of the nest studied in 1950 continued through the incubation period up to the day of hatching of the first egg. Not only did the maintenance of the inner and outer walls of the nest continue through incubation, but it was during this period especially that the adult plastered the outside of the nest with pieces of light green lichens. There were few lichens on the nest at the start of incubation. At the end, the entire outer wall was covered with lichens. The bird often returned after a break in incubation with either a piece of white "wool" or of lichen, although it never carried more than one piece at a time.

Table 1 summarizes my observations of the bird's behavior over one-hour periods during incubation.

While incubating, the bird was restless. It often altered its position when sitting. To illustrate its behavior, I give here an extract from my notes on one hour of observation on August 13:

At 7:55, bird sits with head turned to right (in reference to me) and tramples with its feet; 8:00, tramples, turns counter-clockwise until its back is toward me; 8:07, turns counter-clockwise and sits with head toward me; 8:25, tramples, and nibbles with bill at piece of lichen on the outside of the nest; 8:32, leaves nest, is back at 8:45, with a piece of green lichen which it fastens on the upper part of the outer wall of the nest, sits with head toward me; 8:48, turns counter-clockwise, nibbles at wall of nest, sits with back toward me; 8:51, turns counter-clockwise until head is toward me, tramples and nibbles wall of nest while turning; 8:54, still constantly trampling and nibbling and turning counter-clockwise; 8:55, still incubating.

During rain showers, the incubating bird "spread out" in the nest and pointed its head obliquely upwards so that the rain fell from its plumage. When the nest was in full sunshine, at about noon, the bird stood up in the nest with its bill open and its wings pressed closely to the body.

When incubating, the bird seemed constantly alert; only once, on August 9, at 15:12, did I observe it to stretch its wings, after which it yawned several times and dozed with closed eyes. It awoke at 15:20 and stretched its wings again.

Incubation started with the laying of the first egg (on July 31). The first young hatched on August 16, 16 days later. Incubation does not always start with the laying of the first egg. In a nest in my garden in March, 1952, the first egg was laid on the 6th, the second on the 8th. The adult did not start incubating until March 8. The first egg laid hatched on March 22 at 15:00, when the shells were still in the nest. The second egg hatched before 6:45 on March 24. In this case, the incubation period was 15 to 16 days. This agrees with the incubation period of *Amazilia tzacatl* as determined by Skutch (1931:500 and 1945:16). Muir's (1925:651) observations on *Amazilia tobaci erythronotos* in Trinidad give a much longer period of 21 days. It is clear from Muir's notes that incubation did not start for some time after laying of the first egg.

REARING OF THE YOUNG

I did not see the second egg hatched since I was absent from my home from August 17 to August 21. Throughout the nestling stage, the two young differed markedly in size and they did not leave the nest on the same day.

The newly-hatched nestling is pinkish below and blackish above with a little golden-colored down on its back and head. The mouth-lining is orange, similar in color to the pulp of the fruit of the papaya, *Carica papaya*.

Table 2 gives the weights of the young from August 22 to fledging. Also, the weight of the first nestling on the day of hatching is given.

When the young were small, the adult brooded them after feeding and during the night. Brooding was last seen on August 27, when the larger nestling was 11 days old. At this time, the adult could scarcely cover the young. When the sun shone directly on the young, the adult stood straight up in the nest with its neck stretched upward and its bill held horizontal and opened widely. The wings drooped; the feathers of the back and rump were ruffled, giving the bird a rough appearance. When brooding during rain, the adult sat with its head and bill turned obliquely upward and with its feathers tightly appressed to the body.

The young sat tightly in the nest, clinging to the bottom with their claws. This was important since the branch bearing the nest was often swept to and fro in the wind.

Individual nestlings were fed only when they begged by gaping; the adult invariably fed only the gaping nestling. Figure 1 shows the characteristic posture of the young while begging. Note that the back of the head rests on

TABLE 2
DAILY WEIGHT OF THE YOUNG IN GRAMS

DATE	NESTLING 1	NESTLING 2
August 16	0.4	
August 22	2.55	1.7
August 23	2.58	1.96
August 24	2.75	2.3
August 25	3.13	2.67
August 26	3.1	2.66
August 27	3.28	2.91
August 28	3.52	3.1
August 29	3.8	3.53
August 30	3.98	3.8
August 31	3.97	3.7
September 1	3.92	3.65
September 2	3.9	3.75
September 3	3.8	3.7
September 4	4.0	3.65
September 5	4.0	3.92
	leaves nest	
September 6		3.7
September 7		4.0
		leaves nest

the back of the young bird during gaping. The nestlings often turned around in the nest, at times facing in the same direction, at other times in opposite directions.

Table 3 gives records of feeding of the young during one-hour periods of observation. These records show that frequently the nestlings are fed more than once on each feeding trip by the adult.

I first saw defecation by the young on August 23, when the larger nestling was seven days old. The young bird shuffled to the edge of the nest, pointed its anus upward, forcibly expelled a spray of colorless, fluid feces a considerable distance from the nest, and shuffled back into the nest cup. On August 26, I observed that the feces, for the first time, although exuded in the manner described above, contained of a semi-solid black substance. Muir (1925) observed in Trinidad that an adult *Amazilia tobaci* cleaned the nest of feces from the start of the nestling period. I have not seen nest-cleaning by adults of *Amazilia fimbriata*.

On August 30, when the older nestling was 14 days old, I first saw wing-exercising by the young. One nestling stood in the nest and buzzed its tiny wings in characteristic hummingbird manner. Thereafter wing-exercising, and also preening, became a regular pastime. I noted also that frequently the young hummingbirds scratched their heads with their feet. They did this

TABLE 3
FEEDING OF THE YOUNG

DATE	TIME	NUMBER OF FEEDING VISITS	PORTIONS FED TO:	
			NESTLING 1	NESTLING 2
August 22	15:10-16:10	1	1	0
August 23	6:30- 7:30	2	3	1
	14:18-16:18	7	5	3
			5	0
			1	1
			1	2
			1	1
			1	0
August 24	6:13- 7:13	2	1	1
			2	2
	14:35-15:35	4	1	1
			3	2
			2	2
August 25	7:20- 8:20	2	2	1
			3	2
	14:40-15:40	2	5	4
			3	3
August 26	16:10-17:10	2	3	0
			3	2
			3	2
August 27	11:00-13:00	6	4	5
			2	2
			2	2
			2	2
			2	2
August 28	14:40-15:40	1	4	0
August 29	15:16-16:16	2	2	2
			2	1
August 30	15:25-16:25	2	3	0
			1	1
September 1	15:00-16:00	1	2	2
September 2	15:25-16:25	2	1	1
			1	0
September 3	13:15-14:15	2	3	1
			2	2
September 4	14:30-15:30	1	1	1

September 5, nestling 1 leaves nest at about 15:00.

September 7, nestling 2 leaves nest at about 13:00.

“over the wing,” as I have observed to be the case in the hummingbirds *Anthracothorax nigricollis* and *A. viridigula*. In a half hour period on September 4, one day before the oldest young left the nest, I made the following observations relative to exercising.

At 14:33 older nestling stands in the nest and buzzes with its wings, as does the other one while sitting; 14:35, older nestling again wing-exercising then both young preening; 14:37, wing-exercising of smaller young while standing in the nest; 14:39, older nestling scratches its head with its foot over its wing; 14:50, smaller nestling docs same; 14:52, both young busily buzzing with their wings after having been fed by the parent, older young standing on the wall of the nest; 14:59, older nestling wing-exercising; 15:04, smaller young does the same, then scratches its head.



FIG. 2. Nineteen-day-old nestling of *Amazilia fimbriata*, one day before leaving the nest. Photographed near Paramaribo, Surinam, on September 4, 1950, by Fr. Haverschmidt.

On September 4, I photographed the older nestling (fig. 2). When I held it, it buzzed vertically upward from my hand.

When the young hummers leave the nest they are duller in color than the adults, especially on the underparts, which are brownish instead of bright green. The bill of the young at this time is strikingly shorter than in the adults (compare figs. 1 and 2).

The older young left the nest on September 5, at approximately 15:00. I found it sitting at a height of three meters on a branch of a coffee shrub about ten meters from the nest. The adult fed the fledged young in the shrub after first feeding the young in the nest. At 15:30, the nestling had left the shrub

and was perched on a wire near the house at a height of six meters. Here it spent the night and was still on the wire at 8:00 the next morning. The other nestling left the nest at about 13:00 on September 7, when I found it sitting on the same wire. On September 10, I again saw the adult feeding one young near the nesting site. On October 10, I watched a young Lesson's Emerald as it was fed by an adult near the nest, but I am not sure that this young was from the brood described above.

The young, according to my records, leave the nest only when they can fly well. The nestling period in the brood that I studied was about 20 days.

BATHING AND SUNNING

Lesson's Emeralds bathe regularly. I observed two general methods of bathing, the most common of which is a shower-bath in the rain, a type of bathing indulged in by many other birds in this region. During a rain shower, the hummer perches in an exposed spot with its tail widely spread and its body feathers ruffled. The neck and head are held vertically. While perched in the rain, the bird flaps its wings, opens and shuts its bill, preens, scratches (over the wing), waggles its tail, and frequently wipes its bill on its perch.

The second method of bathing I have called the "rubbing bath." This I first saw on September 14, 1946, when, during a heavy rain-shower, a Lesson's Emerald in flight rubbed its breast and belly over the drenched foliage of a *Terminalia catappa*, the leaves of which are large and leathery. The bird repeated the rubbing again and again until its underparts were thoroughly wet.

While sunning, the hummers sit facing away from the sun, wings closed, but with the body feathers ruffled and the primaries spread.

FOOD

Amazilia fimbriata feeds from flowers not only while hovering but also while perched. In addition to nectar-feeding, I have twice seen *Amazilia* apparently taking sand. On December 11, 1951, and again on January 13, 1952, I saw a hummer hovering only a few centimeters over a patch of fine dry sand near my house in Paramaribo. The bird touched the ground a few times with its bill. Although I could not actually see the bird pick up sand, it seemingly was doing so. I could find no insects on the sandy patch.

FIGHTING

Amazilia fimbriata, like other hummingbirds, is quarrelsome with birds venturing near its nest. On July 23, 1951, a juvenile kite, *Milvago chimachima*, alighted on a branch near a hummer's nest in my garden. Immediately, the hummingbird began diving at the large hawk; the latter ducked its head

at each dive and it soon departed. On September 25, 1950, I saw an adult *A. fimbriata* hotly pursuing a *Buteo magnirostris* through my garden. Small birds such as thrushes (*Turdus leucomelas*) usually immediately retreat from an attack by hummers.

SUMMARY

The foundation of a nest of Lesson's Emerald was found on July 25, 1950. Nest-building lasted for about a week, except that maintenance and plastering of the nest with lichens continued until the first egg hatched.

Incubation began with the laying of the first egg on July 31. The second egg was laid on August 2. The incubation period was approximately 16 days.

The adult made one to four feeding trips per hour, but fed several portions at each trip.

The young left the nest at 20 days; at this age they could fly well.

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